

### A.3. ITFS Digital Data Demodulator (ITFS DDD)

The ITFS Digital Data Demodulator (ITFS DDD), sometimes called the SRI ITFS Receiver, is designed to work directly from the block downconverter so its testing was standalone. Tests with the ITFS DDD concentrated on the output BER as a function of S/N at its input. Measurements were made using random data for a 4Mbps and 128 Kbps rate. All four (MSK, OQPSK, QPSK, and BPSK) input modulation modes were documented. A summary of the test result follow.

<b>Table A.3 A MSK 4 Mbps@ 2.7 Mhz Frequency Deviation</b>					
B to B	BER=10E-8		S/N	BER	BER (VIT)
ATTN=	BER=10E-5	BER(VIT)	S/N=+13	10E-6	<10E-7
S/N=+15	10E-8	<10E-8	S/N=+12	10E-5	<10E-7
S/N=+14	10E-7	<10E-7	S/N=+11	10E-4	<10E-7

<b>Table A.3 B QPSK/OQPSK 4 Mbps</b>					
B to B	BER=10E-8		S/N	BER	BER (VIT)
ATTN=	BER=10E-5	BER(VIT)	S/N=+10	10E-6	10E-8
S/N=+12	10E-8	10E-8	S/N=+9	10E-5	10E-8
S/N=+11	10E-7	10E-8	S/N=+8	10E-4	10E-7

This unit, in the laboratory environment was performing within 2 dB of theory.

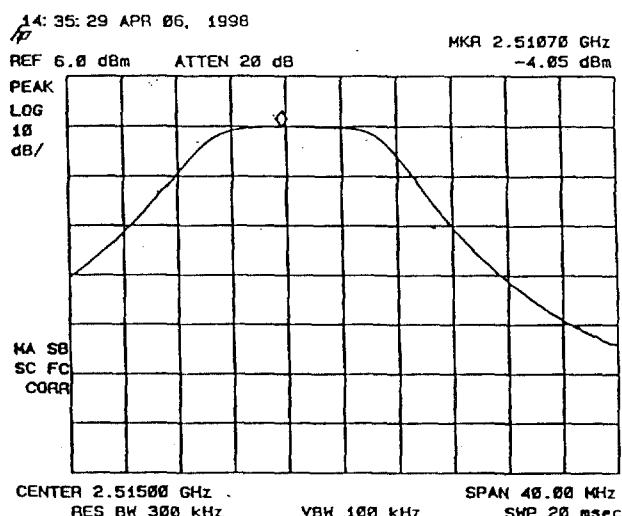
#### A.4. SB 25A ITFS Transmitter

The laboratory tests on the Transmitter (Channel A2) were for Frequency response, linearity and performance with the ITFS DDM::

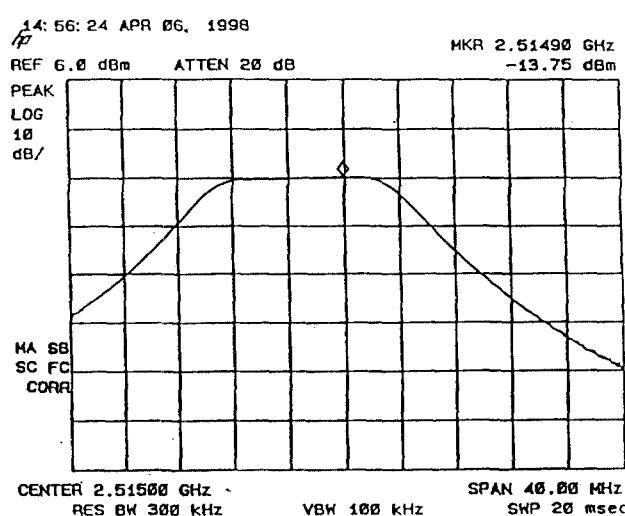
- Frequency Response- The transfer function from IF video in (44Mhz+/-20 Mhz) was determined. The transfer function from IF audio in (44Mhz+/-20 Mhz) was determined.
- Linearity- The minimum input signal level and the maximum input signal level (for 1 dB of compression) was determined.
- Modulation Performance- Tests with the ITFS DDM as input to the Transmitter will concentrate on the output spectrum and the input power level to output power reading. Measurements will be made using random data for 4Mbps and 128 Kbps rateS.

All four (MSK, OQPSK, QPSK, and BPSK) modulation modes were documented. A summary of the test results follow.

#### SB 25A TRANSMITTER FREQUECNY RESPONSE



A.4 A VIDEO



A.4 B AUDIO

The linearity of the transmitter well exceeded the maximum digital power level allowed.

The spectral outputs from the SB 25A Transmitter being driven by the SRI ITFS DDM in the MSK and QPSK mode are shown below:

### SB 25A TRANSMITTER SPECTRAL RESPONSES

15: 41: 18 APR 13, 1998

*HP*

MKR 2.51155 GHz

-21.50 dBm

REF -11.0 dBm ATTEN 10 dB

PEAK

LOG

10  
dB/

WA SB  
SC FC  
CORR

CENTER 2.51160 GHz

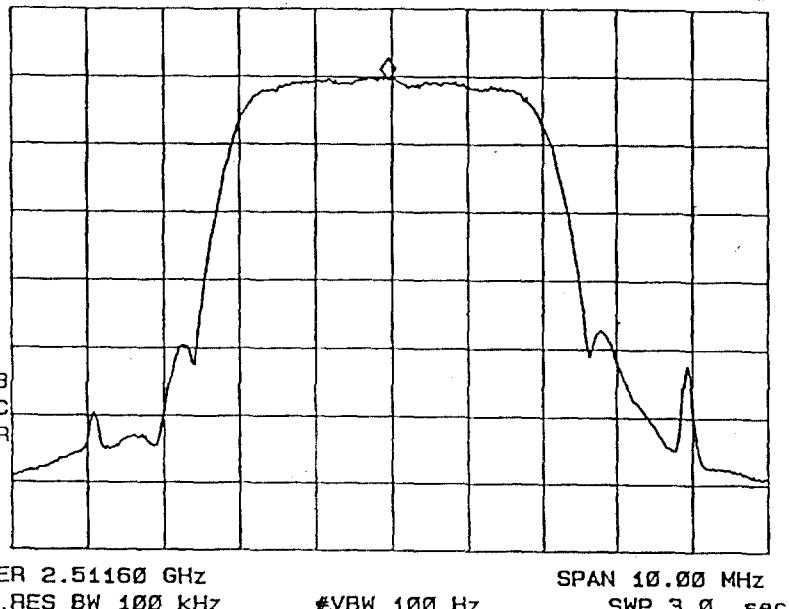
RES BW 100 kHz

#VBW 100 Hz

SPAN 10.00 MHz

SWP 3.0 sec

A.4 C MSK



15: 55: 20 APR 13, 1998

*HP*

MKR 2.51133 GHz

-15.92 dBm

REF -5.0 dBm ATTEN 10 dB

PEAK

LOG

10  
dB/

WA SB  
SC FC  
CORR

CENTER 2.51135 GHz

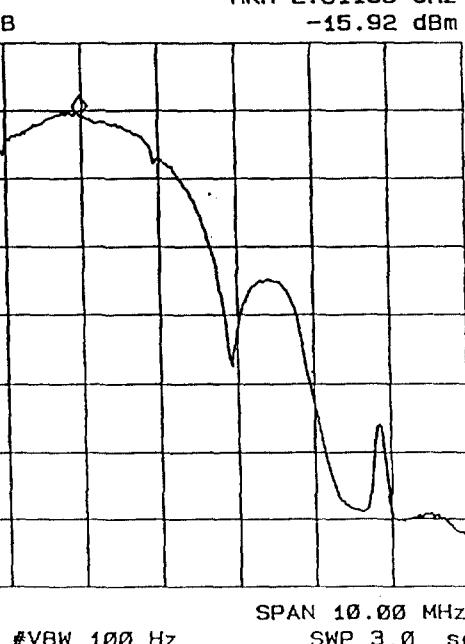
RES BW 100 kHz

#VBW 100 Hz

SPAN 10.00 MHz

SWP 3.0 sec

A.4 D QPSK/OQPSK



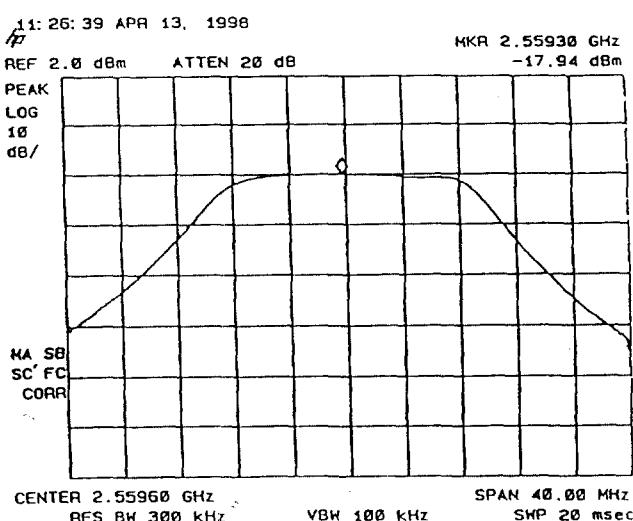
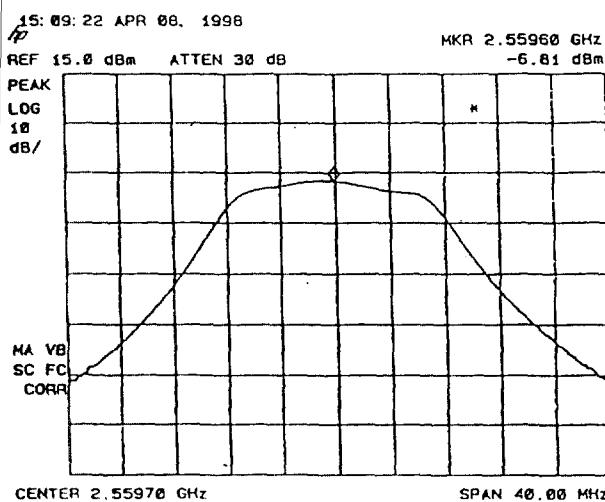
### A.5. R50A/SB 50A ITFS Repeater Driver/Transmitter

The laboratory tests on the Driver/Transmitter (Channel C2) were for Frequency response, linearity and performance with the ITFS DDM::

- Frequency Response- The transfer function from IF video in (44Mhz+/-20 Mhz) was determined. The transfer function from IF audio in (44Mhz+/-20 Mhz) was determined.
- Linearity- The minimum input signal level and the maximum input signal level (for 1 dB of compression was determined.
- Modulation Performance- Tests with the ITFS DDM as input to the Transmitter will concentrate on the output spectrum and the input power level to output power reading. Measurements will be made using random data for 4Mbps and 128 Kbps rate.

A summary of the frequency response test follows.

#### SB 50A TRANSMITTER FREQUECNY RESPONSE



A.5 A VIDEO

A.5 B AUDIO

**TABLE A.7B NARROWBAND LINK -NONREGENERATION REPEAT**

PARAGRAPH	DATA RATE	MODULATION	ENCODE	S/N	ACTUAL BER
3.6.2	64 KBPS	MSK	N	>20	<E-07
	64 KBPS	MSK	Y		<E-07
	64 KBPS	OQPSK	Y		<E-07
	64 KBPS	OQPSK	N		<E-07
	64 KBPS	QPSK	N		<E-07
	64 KBPS	QPSK	Y		<E-07
	64 KBPS	BPSK	Y		<E-07
	64 KBPS	BPSK	N		<E-07
	64 KBPS	MSK	N	-2	-
	64 KBPS	MSK	Y		-
	64 KBPS	OQPSK	Y		<E-06
	64 KBPS	OQPSK	N		<E-06
	64 KBPS	QPSK	N		<E-06
	64 KBPS	QPSK	Y		<E-06
	64 KBPS	BPSK	Y		<E-06
	64 KBPS	BPSK	N		<E-06

**COMMENTS:**

1. 64 Kbps used in lieu of 128 Kbps as the Data Source had not yet been configured to work at 128 Kbps.
2. The frequency deviation was 300 Khz so MSK was really FSK.

**ITFS PACE INITIATIVE**  
**TEST REPORT**  
for  
**DIGITAL DATA TRANSMISSION**  
**INTERNET TO THE SCHOOLS**  
**FIELD TESTS**

**APPENDIX B**

**TEST EQUIPMENT**

TEST EQUIPMENT			
EQUIPMENT	PURPOSE	SERIAL NUMBER	CAL DUE DATE
FIREBERD 6000	BERT	11350	6/98
FIREBERD 2000	DATA SOURCE	07663	6/98
IFR AN 930A	SPECTRUM ANALYZER	01255	10/98
SRI U/D AMPSUM	MISC	001	1/99
HP 435B	POWER METER	2445A10330	8/98
HP 8481	SENSOR	70826	10/98
HP 5381A	COUNTER	2112A16310	4/99
NARDA 769-20	150W 20 DB ATTN	02313	N/A
HP 8494A	0-11 ATTN	2406A09212	12/98
HP8496B	0-110 ATTN	2508A05671	10/98
DOWNCONVERTER(S)	FREQUENCY SHIFT	VARIOUS	N/A
OLSEN OTM-3000	TV MODULATOR	6673	N/A
SHARP 27SV70	MONITOR	314002	N/A